

CLAIMS

WHAT IS CLAIMED IS:

1. A thermoplastic elastomer prepared from a random polytrimethylene ether ester and a polymer selected from the group
5 consisting of polyesters, polyamides, polyurethanes and polyurethane ureas, wherein the random polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or aromatic diacid or diester.
2. The thermoplastic elastomer of claim 1 comprising a soft
10 segment from the random polytrimethylene ether ester and alkylene ester hard segment.
3. The thermoplastic elastomer of claim 2, wherein the alkylene ester hard segment is a tetramethylene ester hard segment.
4. The thermoplastic elastomer of claim 2, wherein the alkylene
15 ester hard segment is a trimethylene ester hard segment.
5. The thermoplastic elastomer of claim 1 which is a polytrimethylene ether ester amide comprising a soft segment from the random polytrimethylene ether ester and a polyamide hard segment.
6. The thermoplastic elastomer of claim 1 which is a
20 polyurethane or polyurethane urea elastomer prepared from (a) the random polytrimethylene ether ester, (b) diisocyanate and (c) diol or diamine chain extender.
7. The thermoplastic elastomer of claim 1 wherein the random
25 polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or aromatic diacid or diester.
8. The thermoplastic elastomer of claim 1 wherein the random
polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or
30 aromatic diacid.
9. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 90 to about 99.9 mole % of the 1,3-propanediol reactant and the about 10 to about 0.1 mole % of aliphatic or aromatic diacid.

10. The thermoplastic elastomer of claim 7 wherein the random polytrimethylene ether ester is prepared from about 80 to about 99.9 mole % of the 1,3-propanediol reactant, the about 10 to about 0.1 mole % of aliphatic or aromatic diacid, and up to about 10 mole % of diol reactant other than 1,3-propanediol reactant.
11. The thermoplastic elastomer of claim 1 wherein the 1,3-propanediol reactant is selected from the group consisting of 1,3-propanediol, and oligomers and prepolymers of 1,3-propanediol having a degree of polymerization of 2 to 9, and mixtures thereof.
12. The thermoplastic elastomer of claim 1 wherein the 1,3-propanediol reactant is 1,3-propanediol.
13. The thermoplastic elastomer wherein the 1,3-propanediol reactant is selected from the group consisting of prepolymers of 1,3-propanediol having a degree of polymerization of 4 to 9 and mixtures thereof.
14. The thermoplastic elastomer of claim 1 wherein the aliphatic or aromatic diacid or ester is selected from the group consisting of aromatic dicarboxylic acids and esters, and combinations thereof.
15. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is selected from the group consisting of aromatic dicarboxylic acids and combinations thereof.
16. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is an aromatic diacid selected from the group consisting of terephthalic acid, isophthalic acid, bibenzoic acid, naphthalic acid, bis(p-carboxyphenyl)methane, 1,5-naphthalene dicarboxylic acid, 2,6-naphthalene dicarboxylic acid, 2,7-naphthalene dicarboxylic acid, 4,4'-sulfonyl dibenzoic acid, p-(hydroxyethoxy)benzoic acid, and combinations thereof.
17. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is terephthalic acid.
18. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 95 to 99.5 mole % of the 1,3-propanediol reactant and about 5 to about 0.5 mole % of the aliphatic or aromatic diacid.

19. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 97.5 to 99 mole % of the 1,3-propanediol reactant and about 2.5 to about 1 mole % of the aliphatic or aromatic diacid.

5 20. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 87.5 to about 99 mole % of the 1,3-propanediol reactant, about 2.5 to about 1 mole % of aliphatic or aromatic diacid or diester, and up to about 10 mole % of diol other than
10 1,3-propanediol reactant.